What is claimed is:

1.   A method of testing an electrode structure in which a plurality of electrodes are arranged in a matrix, comprising:

        (a) positioning a test unit at a position of
5   a target one of said plurality of electrodes apart from said target electrode by a preset distance, wherein said test unit has a MISFET having a source, a gate and a drain;

        (b) applying a first voltage to said target
10 electrode such that a gate voltage is induced at said gate by electrostatic induction;

        (c) applying a second voltage to at least one of said source and said drain such that current flows between said source and said drain based on said gate
15 voltage; and

        (d) examining a value of said current to determine an electrical connection state of said target electrode.

2.   The method according to claim 1, wherein said preset distance is equal to or less than 20 μm.

3.   The method according to claim 1, wherein said (d) examining includes:

        determining that said target electrode is electrically disconnected when said current value is

5 lower than a predetermined threshold value.

4.   The method according to claim 3, further

comprising:

       (e) applying said first voltage to a next

electrode adjacent to said target electrode; and

5   (f) repeating said (d) examining.

5.   The method according to claim 4, wherein said

(f) repeating includes:

       determining that a short circuit is formed

between said target electrode and said next electrode

5 when said current value is equal to or larger than a

predetermined threshold value.

6.   An apparatus for testing an electrode

structure in which a plurality of electrodes are

arranged in a matrix, comprising:

       a testing unit including an array of field

5 effect transistors, each of which has a source, a gate

and a drain, wherein said testing unit responds a test

instruction to carry out a testing operation for

sequentially determining whether each of ones of said

plurality of electrodes corresponding to said

10 transistors is in an electrical disconnection state or

in a short-circuit state, based on a value of current

flowing between said source and said drain in each of

said transistors by use of electrostatic induction
while a first voltage is selectively applied to said
15 electrodes;

a driving unit which relatively moves said
testing unit with respect to said electrode structure
in response to a move instruction while keeping a
predetermined distance between said electrode
20 structure and said testing unit; and

a control unit which outputs said test
instruction to said testing unit, and outputs a move
instruction to said driving unit when said testing
operation by said testing unit in response to said
25 test instruction is ended.

7.   The apparatus according to claim 6, wherein
said testing unit carries out a disconnection testing
operation of said testing operation in which a second
voltage is applied to at least one of said source and
5 said drain in each of said transistors when said first
voltage is applied to said corresponding electrodes
such that a gate voltage is induced at said gate of
said transistor by the electrostatic induction,
compares said current value and a threshold value to
10 determine that said corresponding electrode is in said
electrical disconnect state when said current value is
lower than said threshold value, and repeats said
disconnection testing operation to said corresponding

electrodes.

8.   The apparatus according to claim 6, wherein
said testing unit carries out a short-circuit testing
operation of said testing operation in which said
second voltage is applied to at least one of said
5   source and said drain in each of said transistors when
said first voltage is applied to an adjacent electrode
to said electrode corresponding to said transistor,
compares said current value and said threshold value
to determine that said corresponding electrode is in a
10   short-circuit state when said current value is equal
to or larger than said threshold value, and repeats
said short-circuit testing operation to said
corresponding electrodes while said first voltage is
applied to said adjacent electrodes.

9.   The apparatus according to claim 6, wherein
said testing unit comprises:
          said array of transistors, wherein said drain
of each of said transistors is applied with said
5   second voltage;
          a group of amplifiers provided for said array
of transistors, wherein each of said amplifiers
amplifies said current value from a corresponding one
of said transistors to produce an amplified current
10   value; and

a comparing unit which compares said threshold value and each of said amplified current values while scanning said amplified current values, and outputs to said control unit a comparing result

15 indicating whether each of said amplified current values is equal to or larger than said threshold value.

10. The apparatus according to claim 9, wherein said testing unit has a higher stage portion in which said array of said transistors is provided, and a lower stage portion in which said group of amplifiers

5 and said comprising unit are provided, and

said higher stage portion opposes to said corresponding electrodes to have said predetermined distance.

11. The apparatus according to claim 10, wherein said predetermined distance is not larger than 20 μm.

12. A method of testing an electrode structure in which a plurality of electrodes are arranged in a matrix, comprising:

(a) carrying out in response to a test

5 instruction, a testing operation for sequentially determining whether each of ones of said plurality of electrodes corresponding to field effect transistors

of a testing unit is in an electrical disconnection

state or in a short-circuit state, based on a value of

10 current flowing between a source and a drain in each

of said transistors by use of electrostatic induction

while a first voltage is selectively applied to said

electrodes; and

(b) relatively moves said testing unit with

15 respect to said electrode structure in response to a

move instruction while keeping a predetermined

distance between said electrode structure and said

testing unit, said move instruction is issued when

said testing operation by said testing unit in

20 response to said test instruction is ended.

13.   The method according to claim 12, wherein

said (a) carrying out includes:

(c) carries out a disconnection testing

operation of said testing operation in which a second

5 voltage is applied to at least one of said source and

said drain in each of said transistors when said first

voltage is applied to said corresponding electrodes

such that a gate voltage is induced at said gate of

said transistor by the electrostatic induction;

10   (d) comparing said current value and a

threshold value to determine that said corresponding

electrode is in said electrical disconnect state when

said current value is lower than said threshold value;

and

15   (e) repeating said disconnection testing

operation to said corresponding electrodes.

14.   The method according to claim 12, wherein

said (a) carrying out includes:

        (f) carrying out a short-circuit testing

operation of said testing operation in which said

5   second voltage is applied to at least one of said

source and said drain in each of said transistors when

said first voltage is applied to an adjacent electrode

to said electrode corresponding to said transistor;

        (g) comparing said current value and said

10 threshold value to determine that said corresponding

electrode is in a short-circuit state when said

current value is equal to or larger than said

threshold value; and

        (h) repeating said short-circuit testing

15 operation to said corresponding electrodes while said

first voltage is applied to said adjacent electrodes.

15.   The apparatus according to claim 12, wherein

said predetermined distance is not larger than 20 μm.

16.   An apparatus for testing an electrode

structure in which a plurality of electrodes are

arranged in a matrix, comprising:

a testing unit including an array of field

5 effect transistors, each of which has a source, a gate

and a drain, wherein said testing unit responds a test

instruction to carry out a testing operation for

sequentially determining a value of current flowing

between said source and said drain in each of said

10 transistors by use of electrostatic induction from

each of ones of said plurality of electrodes

corresponding to said transistors while a first

voltage is applied to said electrodes;

a driving unit which relatively moves said

15 testing unit with respect to said electrode structure

in response to a move instruction while keeping a

predetermined distance between said electrode

structure and said testing unit; and

a control unit which outputs said test

20 instruction to said testing unit, and outputs a move

instruction to said driving unit when said testing

operation by said testing unit in response to said

test instruction is ended, wherein said control unit

determines each of ones of said plurality of

25 electrodes corresponding to said transistors is in an

electrical disconnection state or in a short-circuit

state, based on said current value.

17.   The apparatus according to claim 16, wherein

said testing unit carries out a disconnection testing

operation of said testing operation in which a second

voltage is applied to at least one of said source and

5   said drain in each of said transistors when said first

voltage is applied to said corresponding electrodes

such that a gate voltage is induced at said gate of

said transistor by the electrostatic induction to

produce said current value, and

10   said control unit compares said current value

and a threshold value to determine that said

corresponding electrode is in said electrical

disconnect state when said current value is lower than

said threshold value.

18.   The apparatus according to claim 16, wherein

said testing unit carries out a short-circuit testing

operation of said testing operation in which said

second voltage is applied to at least one of said

5   source and said drain in each of said transistors when

said first voltage is applied to an adjacent electrode

to said electrode corresponding to said transistor, to

produce said current value, and

         said control unit compares said current value

10   and said threshold value to determine that said

corresponding electrode is in a short-circuit state

when said current value is equal to or larger than

said threshold value.

19:      The apparatus according to claim 16, wherein said testing unit comprises:

said array of transistors, wherein said drain of each of said transistors is applied with said

5 second voltage;

a group of amplifiers provided for said array of transistors, wherein each of said amplifiers amplifies said current value from a corresponding one of said transistors to produce an amplified current

10 value; and

a switching unit which sequentially outputs said amplified current values to said control units.

20.   The apparatus according to claim 19, wherein said testing unit has a higher stage portion in which said array of said transistors is provided, and a lower stage portion in which said group of amplifiers

5 and said switching unit are provided, and

said higher stage portion opposes to said corresponding electrodes to have said predetermined distance.